

We claim:

1. An unleaded gasoline fuel, suitable for combustion in an automotive engine having the following properties:

- (1) a 50% D-86 distillation point no greater than 215° F. (101.7° C.); and
- (2) a Reid Vapor Pressure no greater than 8.0 psi (0.54 atm).

2. A gasoline fuel as defined in claim 1 having an olefin content less than 10 percent by volume.

3. A gasoline fuel as defined in claim 2 having a 50% D-86 distillation point no greater than 205° F. (96.1° C.).

4. A gasoline fuel as defined in claim 3 wherein the 10% D-86 Distillation Point is no greater than 140° F. (60° C.).

5. A gasoline fuel as defined in claim 3 comprising at least 65 percent by volume paraffins.

6. A gasoline fuel as defined in claim 3 wherein the 50% D-86 distillation point is less than 200° F. (93.3° C.).

7. A gasoline fuel as defined in claim 3 wherein the 50% D-86 distillation point is less than 195° F. (90.6° C.).

8. A gasoline fuel as defined in claim 7 wherein the paraffin content is greater than 75 volume percent.

9. A gasoline fuel as defined in claim 7 wherein the olefin concentration is less than 5 volume percent.

10. A gasoline fuel as defined in claim 9 wherein the 50% D-86 distillation point is less than 190° F. (87.8° C.).

11. A gasoline fuel as defined in claim 10 wherein the olefin concentration is less than 2 volume percent.

12. A gasoline fuel as defined in claim 11 wherein the 50% D-86 distillation point is less than 185° F. (85.0° C.).

13. A gasoline fuel as defined in claim 12 wherein the olefin concentration is less than 1 volume percent.

14. A gasoline fuel as defined in claim 13 wherein the olefin concentration is less than 0.5 volume percent.

15. A gasoline fuel as defined in claim 14 wherein the 50% D-86 distillation point is greater than 180° F. (82.2° C.).

16. A gasoline fuel as defined in claim 15 wherein the paraffin content is at least 90 volume percent.

17. A gasoline fuel as defined in claim 15 wherein the olefin concentration is essentially zero volume percent.

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18. A gasoline fuel as defined in claim 17  
wherein the research octane number is at least 90, the 10%  
D-86 distillation point is no greater than 135° F.  
(57.2° C.), and the 90% D-86 distillation point is no  
greater than 315° F. (157° C.).

19. A gasoline fuel as defined in claim 3  
wherein the olefin content is less than 5.0 volume percent  
and the 50% D-86 Distillation Point is greater than  
180° F. (82° C.).

20. A gasoline fuel as defined in claim 19  
wherein the olefin content is less than 0.5 volume percent.

21. A gasoline fuel as defined in claim 19  
wherein the olefin content is essentially zero.

22. A gasoline fuel as defined in claim 21  
wherein the Reid Vapor Pressure is no greater than 7.5 psi  
(0.51 atm).

23. A gasoline fuel as defined in claim 20  
wherein the Reid Vapor Pressure is no greater than 7.5 psi  
(0.51 atm).

24. A gasoline fuel as defined in claim 21  
wherein the Reid Vapor Pressure is no greater than 7.0 psi  
(0.51 atm).

25. A gasoline fuel as defined in claim 20  
wherein the Reid Vapor Pressure is no greater than 7.0 psi  
(0.51 atm).

26. A gasoline fuel as defined in claim 22 wherein the research octane number is at least 90, the 10% D-86 distillation point is no greater than 135° F. (57.2° C.), and the 90% D-86 distillation point is no greater than 315° F. (157° C.).

27. A gasoline fuel as defined in claim 26 wherein the aromatics content is at least 35 volume percent.

28. A gasoline fuel as defined in claim 26 wherein the 10% D-86 Distillation Point is no greater than 120° F. (49° C.), the 50% D-86 Distillation Point is less than 200° F. (93° C.), and the paraffin content is at least 85 volume percent.

29. A gasoline fuel as defined in claim 28 wherein the 90% D-86 distillation point is no greater than 300° F. (149° C.), and the fuel contains essentially no methyl tertiary butyl ether.

30. A gasoline fuel as defined in claim 1 wherein the olefin content is less than 5 volume percent.

31. A gasoline fuel as defined in claim 1 wherein the olefin content is less than 2 volume percent.

32. A gasoline fuel as defined in claim 1 wherein the olefin content is less than 0.5 volume percent.

33. A gasoline fuel as defined in claim 1 wherein the 50% D-86 Distillation Point is no more than 205° F. (96.1° C.).

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34. A gasoline fuel as defined in claim 1 wherein the 50% D-86 Distillation Point is no more than 200° F. (93.3° C.).

35. A gasoline fuel as defined in claim 1 wherein the 50% D-86 Distillation Point is no more than 195° F. (90.6° C.).

36. A gasoline fuel as defined in claim 1 wherein the 50% D-86 Distillation Point is no more than 190° F. (87.8° C.).

37. A gasoline fuel as defined in claim 1 wherein the Reid Vapor Pressure is no greater than 7.5 psi (0.51 atm).

38. A gasoline fuel as defined in claim 1 wherein the Reid Vapor Pressure is no greater than 7.0 psi (0.48 atm).

39. A gasoline fuel as defined in claim 1 wherein the 50% D-86 distillation point is less than 208° F. (97.8° C.), and the Reid Vapor Pressure is no greater than 8.0 psi (0.54 atm).

40. A gasoline fuel as defined in claim 1 wherein the 50% D-86 distillation point is no greater than 206° F. (96.7° C.), and the olefin concentration is less than 1 volume percent.

41. An unleaded gasoline fuel, suitable for combustion in an automotive engine, having an olefin content less than 3.0 volume percent and a 50% D-86 distillation point no greater than 205° F. (96° C.).

42. A gasoline fuel as defined in claim 41 wherein the 50% D-86 Distillation Point is greater than 180° F. (82° C.).

43. A gasoline fuel as defined in claim 39 wherein the 50% D-86 Distillation Point is greater than 180° F. (82° C.) but no greater than 200° F. (93° C.) and the olefin content is less than 1 volume percent.

44. A gasoline fuel as defined in claim 41 wherein the 50% D-86 Distillation Point is greater than 180° F. (82° C.) but no greater than 195° F. (90.6° C.).

45. An unleaded gasoline fuel, suitable for combustion in an automotive engine, having a Reid Vapor Pressure no greater than 8.0 psi (0.54 atm) and containing at least 40 volume percent paraffins.

46. A gasoline fuel as defined in claim 45 wherein the paraffin content is greater than 50 volume percent.

47. A gasoline fuel as defined in claim 45 wherein the paraffin content is greater than 65 volume percent.

48. A gasoline fuel as defined in claim 45 wherein the olefin content is less than 15 volume percent.

49. A gasoline fuel as defined in claim 45 wherein the olefin concentration is less than 1 volume percent.

50. A gasoline fuel as defined in claim 49 wherein the Reid Vapor Pressure is no greater than 7.5 psi (0.51 atm).

51. A gasoline fuel as defined in claim 50 wherein the olefin concentration is essentially zero volume percent.

52. A gasoline fuel as defined in claim 49 wherein the Reid Vapor Pressure is no greater than 7.0 psi (1.48 atm).

53. A gasoline fuel as defined in claim 50 containing at least 75 percent by volume paraffins.

54. An unleaded gasoline fuel, suitable for combustion in an automotive engine, having a Reid Vapor Pressure no greater than 7.5 psi (0.51 atm) and containing essentially no methyl tertiary butyl ether and less than 15 volume percent olefins.

55. A gasoline fuel as defined in claim 54 containing less than 10 volume percent olefins.

56. A gasoline fuel as defined in claim 54 containing less than 5 volume percent olefins.

57. A gasoline fuel as defined in claim 54 containing less than 2 volume percent olefins.

58. A gasoline fuel as defined in claim 54 containing essentially zero olefins.

59. In a method for producing a gasoline fuel comprising blending a plurality of hydrocarbon-containing streams together so as to produce a gasoline product suitable for combustion in an automotive spark-induced internal combustion engine, the improvement comprising adjusting the rates at which such hydrocarbon-containing streams are blended so as to produce a gasoline fuel as defined in claim 1.

60. In a method for producing a gasoline fuel comprising blending a plurality of hydrocarbon-containing streams together so as to produce a gasoline product suitable for combustion in an automotive spark-induced internal combustion engine, the improvement comprising adjusting the rates at which such hydrocarbon-containing streams are blended so as to produce a gasoline fuel as defined in claim 17.

61. In a method for producing a gasoline fuel comprising blending together a first hydrocarbon-containing stream boiling in the gasoline range of 77° F. (25° C.) to 437° F. (225° C.) with one or more second hydrocarbon-containing streams boiling in the gasoline range of 77° F. (25° C.) to 437° F. (225° C.) so as to produce a gasoline product suitable for combustion in an automotive spark-induced internal combustion engine, the improvement comprising adjusting the rates at which such hydrocarbon-containing streams are blended so as to affect at least three of the properties of the first hydrocarbon stream as follows:

(a) the 50% D-86 distillation point is reduced by at least 20° F. (11.1° C.);

(b) the Reid Vapor Pressure is decreased by at least 1 psi (0.07 atm.);



(c) the olefin content is decreased by at least 3 volume percent;

(d) the paraffin content is increased by at least 10 volume percent;

(e) the 10% D-86 Distillation Point is decreased by at least 10° F. (5.6° C.) ; and

(f) the aromatics content is increased by at least 10 volume percent.

62. The method of claim 61 wherein at least three of the properties are affected as follows:

(a) the 50% D-86 distillation point is reduced by at least 40° F. (22.1° C.);

(b) the Reid Vapor Pressure is decreased by at least 2 psi (0.14 atm.);

(c) the olefin content is decreased by at least 5 volume percent;

(d) the paraffin content is increased by at least 20 volume percent.

63. In a method for combusting a gasoline fuel so as power an automotive engine, the improvement for reducing the emissions of gaseous pollutants selected from the group consisting of NOx, CO, and hydrocarbons during the combustion of said fuel by combusting in said automotive engine the fuel of claim 1.

64. In a method for combusting a gasoline fuel so as power an automotive engine, the improvement for reducing the emissions of gaseous pollutants selected from the group consisting of NOx, CO, and hydrocarbons during the combustion of said fuel by combusting in said automotive engine the fuel of claim 17.





77. The method of claim 76 wherein the amount of gasoline fuel derived in step (a) is at least 25 percent of the daily gasoline fuel production at said refinery.

78. A method for reducing the levels of air pollution in a county, said air pollution resulting at least in part from the combustion of gasoline in automotive engines, the method comprising:

5 (a) deriving, in one or more oil refineries, a gasoline fuel as defined in claim 3 from a whole crude or fraction thereof;

(b) delivering at least some of said fuel to storage facilities in one or more gasoline service stations;

10 (c) fueling, from the total of said service stations, at least 1,000 automotive vehicles with said fuel from said storage facilities;

(d) operating said automotive vehicles by combusting in the automotive engine thereof said fuel.

79. The method of claim 78 wherein at least 10,000 automotive vehicles are fueled in step (c) with said fuel, which vehicles are subsequently operated with said fuel in step (d).

80. The method of claim 78 wherein said gasoline fuel is derived in said refinery with no additive being added thereto in an amount sufficient to substantially reduce the emissions of NOx, CO, or hydrocarbons when  
5 combusted in a spark-induced, internal combustion automotive engine.

81. The composition of claim 1 which reduces the total amount of CO, NOx, and hydrocarbons by at least 20% in comparison to fuel A/O AVE in Table 2 when combusted in the same engine under the same conditions.

82. The composition of claim 1 which reduces the total amount of any of CO, NOx, and hydrocarbons by at least 10% in comparison to fuel A/O AVE in Table 2 when combusted in the same engine under the same conditions.